APPENDIX E

DATA VALIDATION SUMMARY REPORT

Data Validation Summary Report
For the Site Investigation Performed at the
"Boiler Plant No. 2" (Parcel GSBP-23)
QST Site SI02
Fort McClellan, Calhoun County, Alabama

1.0 Introduction

Level III data validation was performed on 100 percent of the environmental samples collected by QST for Site SI02. The analytical data consisted of several SDGs, which were analyzed by QST Environmental and Savannah Laboratories (soil samples for VOC analysis). The chemical parameters for which the samples were analyzed and validated are identified below:

Parameter (Method)
Volatile Organic Compounds by SW-846 8260B
Semivolatile Organic Compounds by SW-846 8270C
Inorganic Compounds (TAL Metals) by SW-846 6010B
Inorganic Compounds (Mercury) by SW-846 7471/7470
Wet Chemistry Total Organic Carbon by SW-846 9060

2.0 Procedures

The sample data were validated following the logic identified in the *USEPA 540/R-94-013 Contract Laboratory Program (CLP) National Functional Guidelines For Inorganic Data Review (February 1994)* and *USEPA 540/R-99/008 Contract Laboratory Program National Functional Guidelines For Organic Review (October 1999)* for all areas except Blanks. *Region III Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (April 1993)* and *Region III National Functional Guidelines for Organic Data Review (June 1992)* were applied to the areas associated with blank contamination. Specific quality control (QC) criteria, as identified in the Quality Assurance Plan (QAP) and data deliverables were applied to all sample results. It should be noted where there were discrepancies in the QC criteria identified in the QAP and the data deliverables, the QC criteria identified in the data deliverables was applied. It should also be noted that the range for QC criteria was not always identified in the deliverables. The lab "flagged" the data that did not meet acceptance criteria. In these cases, the data were qualified to indicate the bias. Biased low results were estimated (qualified "J/UJ") and biased high resulted only in positive results being estimated (qualified "J").

The data validation process not only included a thorough review of the data deliverables, which resulted in validation qualifiers being applied, but also included a detailed evaluation of the

electronic results for the historical QST data which were downloaded from the "Installation Restoration Data Information Management System (IRDIMS)". During this evaluation it was discovered that various electronic results, which were actually detected hits below the Reporting Limits (RL), were reported as non-detects. These results were changed in the database to reflect the actual concentration from the quantitation reports found in the data deliverable and qualified as estimated values below the RL. During the comparison of the hard copy and electronic data, it was also determined that non-detect reported concentrations for soil samples reported electronically were not corrected for moisture content and the hard copy used the correct moisture content to report results on an as received basis.

As the result of the use of Update III SW846 test methods for the analytical data and the application of the CLP guidelines during the validation process, there were instances where specific QC requirements for all target compounds were not defined. This primarily occurred in the organic, Gas Chromatograph (GC) and Gas Chromatograph/Mass Spectra (GC/MS) calibration areas and is due to the fact that the analytical methods are "performance-based", and allows the use of average calibration responses, in lieu of, individual responses, which are defined by CLP protocol. In light of applying CLP guidelines to SW846 methods and evaluating the usability of the data during the validation process, specific QC criteria were determined to address all target compounds and are identified in this report for each parameter, as well as, in the validation checklists, which function as worksheets. All completed validation checklists are on file in the Knoxville office. For those analytical methods not addressed by the CLP and Region III guidelines, the validation was based on the method requirements and technical judgement, following the logic of the CLP validation guidelines.

3.0 Summary of Data Validation Findings

The overall quality of the data was determined to be acceptable. The only rejected data ("R") qualified) were "poor performing" volatile compounds (ketones, some halogenated hydrocarbons, e.g.), which exhibited poor calibration responses in the associated calibration data, semivolatile compounds which experienced low laboratory control sample recoveries, and samples that were reanalyzed and have more than one result reported. The "R" qualifier was assigned to the samples with more than one set of results to indicate that a given result should not be used to characterize a particular constituent or an analysis for a given sample.

Individual validation reports have been prepared for each parameter and the overall results of the validation findings are summarized in this report. The validation qualifier data entry verification report (Attachment A) is also provided. This is a complete listing of all of the analytical results and the validation qualifiers assigned for Site SI02. It also identifies the 'use'

column, which indicates which result to use in the event of a reanalysis. A listing of the validation qualifiers and the reason codes, along with their definitions are also found in Attachment A. The following section highlights the key findings of the data validation for each analysis.

4.0 Analysis-Specific Data Validation Summaries

4.1 Volatile Organic Compounds by SW846 8260B

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all project samples.

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria, with the exception of the following:

The following demonstrated RRFs below 0.1 in the ICAL and/or CCAL or Correlation Coefficient ($R^2 < 0.990$): Non-detect results were rejected (qualified 'R'); Positive results were estimated (qualified 'J'); Unless 'B' qualified due to blank contamination.

SDG Number	Sample Number	Compound	Validation Qualifier
ZLHC	02-GW01	2-Butanone, 2-Chloroethyl Vinyl Ether	R
ZLIC	02-GW02, 02-GW03, 02-GW04	2-Butanone	R
XENR (QST09)	02-SS01A, 02-SS01B, 02-SS02A, 02-SS02B, 02-SS03A, 02-SS03B, 02-SS04	Bromomethane	R
QST10	02-SS05, 02-SS06, 02-SS09A-FD, 02-SS7A, 02-SS7B, 02-SS8A, 02-SS8B, 02-SS9B, 02-SS09A	Bromomethane	R

All sample criteria for individual ICAL %RSD>30 and/or CCAL %D>20 was found to be acceptable with the exception of the following:

SDG Number	Sample Number	Compound	Validation Qualifier
ZLHC	02-GW01	2-Butanone, Acetone, Chloroethane, 1,1,2,2-Tetrachloroethane, 1,1,2-Trichloroethane, 4-Methyl-2-pentanone, Vinyl Acetate, 2-Hexanone	R/UJ
ZLIC	02-GW02, 02-GW03, 02-GW04	Acetone, 2-Butanone, Chloroethane, 2-Chloroethyl Vinyl Ether	R/UJ/B
XENR (QST09)	02-SS01A, 02-SS01B, 02-SS02A, 02-SS02B, 02-SS03A, 02-SS03B, 02-SS04	Vinyl Acetate	UJ
QST10	02-SS05, 02-SS06, 02-SS09A-FD, 02-SS7A, 02-SS7B, 02-SS8A, 02-SS8B, 02-SS9B, 02-SS09A	Bromomethane, 1,2-Dichloroethane, 2-Hexanone, Bromoform, Vinyl Acetate, Dibromochloromethane, trans-1,3-Dichloropropene	R/UJ

Blanks

The 5X/10X rule for contaminants found in the associated equipment rinses, trip, and method blanks was applied to all sample results. All were found to be acceptable, with the exception of the following:

SDG Number	Sample Number	Compound	Blank Contaminant	Validation Qualifier
XENR (QST09)	02-SS01A, 02-SS01B, 02-SS02A, 02-SS02B, 02-SS03A, 02-SS04	Methylene Chloride	Method	B
ZLIC	02-GW03	Acetone	Method/TB	B

Surrogate Recoveries

All surrogate recoveries met QC criteria.

Matrix Spike / Matrix Spike Duplicate

MS/MSD analysis was performed for the project samples and all QC criteria were met.

Laboratory Control Sample

LCS was performed for the project samples and all QC criteria were met with the exception of the following:

SDG Number	Sample Number	Compound	Validation Qualifier
ZLHC	02-GW01	2-Chloroethyl Vinyl Ether	R
ZLIC	02-GW01, 02-GW03, 02-GW04	2-Butanone, Styrene	R/UJ

Internal Standards

All internal standards met QC criteria.

Field Duplicates

Original and field duplicate results were evaluated and all QC criteria (35% water/50% soil) were met with the exception of the following:

SDG Number	Sample Number	Compound	Validation Qualifier
QST10	02-SS09A and 02-SS09A-FD	1,2-Dichloroethene, 1,1,1-Trichloroethane, 1,2-Dichloropropane, Methylene Chloride, Trichloroethene	J

Quantitation

Results quantified between the MDL and the RL were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

4.2 Semivolatile Organic Compounds by SW846 8270C

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all project samples.

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria, with the exception of the following:

The following exhibited individual ICAL %RSD>30 and/or CCAL %D>20: Non-detect results were estimated (qualified 'UJ'); Unless rejected (qualified 'R') due to ICAL/CCAL minimum RRF criteria not met; Positive results were estimated (qualified 'J'); Unless 'B' qualified due to blank contamination.

SDG Number	Sample Number	Compound	Validation Qualifier
XEKP	02-SS03A, 02-SS03B, 02-SS04	2,4-Dinitrophenol, 2,4-Dinitrotoluene, 4,6-Dinitro-2-methylphenol, Butyl benzyl phthalate	UJ
	02-SS01A	2,4-Dinitrophenol, Butyl benzyl phthalate	UJ
	02-SS01B, 02-SS02A, 02-SS02B	2,4-Dinitrophenol, Butyl benzyl phthalate, Bis(2-Ethylhexyl)phthalate	UJ/J
XELP	02-SS05, 02-SS06, 02-SS09A-FD, 02-SS09A, 02-SS9B	2,4-Dinitrophenol, 2,4-Dinitrotoluene, 3,3'-Dichlorobenzidine, 4-Chloroaniline, Butyl benzyl phthalate, Bis(2-Ethylhexyl)phthalate	UJ/B
	02-SS8A, 02-SS8B, 02-SS7A	2,4-Dinitrophenol, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 4-Chloroaniline, Butyl benzyl phthalate	UJ
ZLMC	02-GW04, 02-GW01, 02-GW02, 02-GW03	2,4-Dinitrophenol, 2,4-Dinitrotoluene, 3,3'-Dichlorobenzidine, 4-Chloroaniline, Butyl benzyl phthalate, Pyrene, Bis(2-Ethylhexyl)phthalate	UJ/B/J
XENP	02-SS7B	2,4-Dinitrophenol, 3,3-Dichlorobenzidine, 4-Chloroaniline, Butyl benzyl phthalate, Isophorone, bis(2-Chloroethyl)ether, n-Nitroso-di-n-propylamine	UJ

Blanks

The 5X/10X rule for contaminants found in the associated method blanks was applied to all sample results. All were found to be acceptable with the exception of the following:

SDG Number	Sample Number	Compound	Blank Contaminant	Validation Qualifier
XELP	02-SS05, 02-SS06, 02-SS09A-FD, 02-SS09A, 02-SS9B, 02-SS8A, 02-SS8B, 02-SS7A	Bis(2-Ethylhexyl)phthalate	Method	B
	02-SS8A, 02-SS8B	Di-n-butyl-phthalate	Method	B
XEKP	02-SS03A, 02-SS03B, 02-SS04, 02-SS01A, 02-SS02B	Bis(2-Ethylhexyl)phthalate	Method	B
XENP	02-SS7B	Bis(2-Ethylhexyl)phthalate	Method	B
ZLMC	02-GW04, 02-GW01, 02-GW03	Bis(2-Ethylhexyl)phthalate	Method	B

Surrogate Recoveries

All surrogate recoveries are within acceptable QC ranges for the surrogates.

Matrix Spike / Matrix Spike Duplicate

MS/MSD analysis was performed for the project samples and all QC criteria were met with the exception of the following:

SDG Number	Sample Number	Compound	Validation Qualifier
XENP	02-SS7B	2,4-Dinitrotoluene	UJ

Laboratory Control Sample

LCS was performed for the project samples and all QC criteria were met with the exception of the following:

SDG Number	Sample Number	Compound	Validation Qualifier
XEKP	02-SS03A, 02-SS03B, 02-SS04, 02-SS01A, 02-SS01B, 02-SS02A, 02-SS02B	Hexachlorocyclopentadiene	R
XELP	02-SS05, 02-SS06, 02-SS09A-FD, 02-SS09A, 02-SS9B, 02-SS8A, 02-SS8B, 02-SS7A	Hexachlorocyclopentadiene, bis(2-Chloroisopropyl)ether	R
XENP	02-SS7B	Hexachlorocyclopentadiene	R
ZLMC	02-GW04, 02-GW01, 02-GW02, 02-GW03	4-Nitroaniline	R

Internal Standards

All internal standards met QC criteria.

Field Duplicates

Original and field duplicate results were evaluated and no problems were identified.

Quantitation

Results quantified between the MDL and the RL were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

4.3 Metals by SW846 6010B

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples.

Initial and Continuing Calibrations
All initial and continuing calibrations associated with the project samples met QC criteria.

Blanks
The 5X rule for contaminants found in the associated equipment rinse, calibration, and method blanks was applied to all sample results. All were found to be acceptable.

Matrix Spike / Matrix Spike Duplicate
MS/MSD analysis was performed for the project samples and all QC criteria were met with the exception of the following:

SDG Number	Sample Number	Compound	Validation Qualifier
SLAP	02-SS8A	Chromium, Cobalt, Manganese	J
SLVO	02-SS01A	Chromium	J

Post Digestion Spike
Post digestion spike was performed for the project samples and all QC criteria were met with the exception of the following:

SDG Number	Sample Number	Compound	Validation Qualifier
UJFY	02-GW04, 02-GW02, 02-GW03, 02-GW01	Calcium	J

Laboratory Control Sample (LCS)
LCS was performed for the project samples and all QC criteria were met with the exception of the following:

SDG Number	Sample Number	Compound	Validation Qualifier
UJFY	02-GW04, 02-GW02, 02-GW03, 02-GW01	Manganese, Vanadium	J

Interference Check Sample (ICS)
All ICS % recoveries were acceptable. All QC criteria were met.

ICP Serial Dilutions
All QC criteria were met for the serial dilutions with the exception of the following:

SDG Number	Sample Number	Compound	Validation Qualifier
SLAP	02-SS8A	Arsenic, Beryllium, Zinc	J
SLVO	02-SS01A	Nickel, Zinc	J

Field Duplicates
Original and field duplicate results were evaluated and all QC criteria (35% water/50% soil) were met with the exception of the following:

SDG Number	Sample Number	Compound	Validation Qualifier
SLXO	02-SS09A and 02-SS09A-FD	Arsenic, Cobalt, Lead, Manganese, Thallium	J

Sample Quantitation
Results quantified between the MDL and the RL were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

4.4 Mercury by SW846 7471/7470

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times
Technical holding time criteria were met for all samples.

Initial and Continuing Calibrations
All initial and continuing calibrations associated with the project samples met QC criteria.

Blanks
The 5X rule for contaminants found in the associated equipment rinse, calibration, and method blanks was applied to all sample results. All were found to be acceptable.

Matrix Spike / Matrix Spike Duplicate
MS/MSD analysis was performed for the project samples and all QC criteria were met with the exception of the following:

SDG Number	Sample Number	Compound	Validation Qualifier
SLBP	02-SS03A, 02-SS03B, 02-SS04, 02-SS05, 02-SS06, 02-SS7B	Mercury	J

Laboratory Control Sample (LCS)
LCS was performed for the project samples and all QC criteria were met.

Interference Check Sample (ICS)
All ICS % recoveries were acceptable. All QC criteria were met.

ICP Serial Dilutions
All QC criteria were met for the serial dilutions.

Field Duplicates
Original and field duplicate results were evaluated and all QC criteria (35% water/50% soil) were met.

Sample Quantitation
Results quantified between the MDL and the RL were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

4.5 Wet Chemistry TOC by SW846 9060

Overall, the data are of good quality and are usable as reported by the laboratory. Data were reviewed for the following:

Holding Times
Technical holding time criteria were met for all project samples.

Initial and Continuing Calibration
All initial and continuing calibrations associated with the project samples met QC criteria.

Blanks
The 5X rule for contaminants found in the associated blanks was applied to all sample results. All were found to be acceptable.

Matrix Spike / Matrix Spike Duplicate
MS/MSD analysis was performed for the project samples and all QC criteria were met with the exception of the following:

SDG Number	Sample Number	Compound	Validation Qualifier
ZEWU	02-SS05	TOC	J

Laboratory Control Sample
LCS was performed for the project samples and all QC criteria were met.

Field Duplicates
Original and field duplicate results were evaluated and all QC criteria (35% water/50% soil) were met.

Quantitation

Results quantified between the MDL and the RL were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.